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Document 15.5
Aerial Lift Safety

Recommended for approval by the ES&H Working Group

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New document or new requirements

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☒ **New document**
☐ **Major requirement change**

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15.5

Aerial Lift Safety*

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Aerial Lift Safety

1.0 Introduction

Various aerial lifts are used at the Lawrence Livermore National Laboratory (LLNL), such as self-propelled elevating work platforms (e.g., scissor lifts), manually-propelled elevating aerial lifts (e.g., uprights), extensible and articulating boom-supported elevating work platforms (e.g., aerial man-lifts), and vehicle-mounted elevating and rotating aerial devices and work platforms (e.g., bucket trucks). Many different codes and standards govern the use of this equipment at LLNL to ensure the safety of operators and other workers. This E*nvironment, Safety and Health (ES&H) Manual* document is based on codes and standards adopted in the Work Smart Standard (WSSs) for aerial lifts, along with manufacturers' recommendations and other standards that apply for LLNL activities.

This document contains requirements for aerial lifts that lift workers and tools to elevated work sites. It does not contain requirements for the use of fire-fighting equipment, such as those covered in the American National Standards Institute/ Automotive Fire Apparatus (ANSI/NFPA) 1901-1996, or personal platforms attached to a crane boom or suspended by hooks. See Appendix A for definitions of terms used in this document.

All workers must comply with the requirements set forth in this document. Any deviation from these requirements will require approval by the appropriate management chain. For deviations and exemptions, see Document 2.3, "LLNL Exemption Process," in the *ES&H Manual*.

2.0 Hazards

The following conditions occurring during aerial lift operations can result in property damage, personal injury, or death:

- A fall from an elevated level.
- Falling objects or items falling out of lifts.
- Exceeding the load capacity of the lift, which may result in tip-over or structural failure.
- Electrical hazards (e.g., overhead power lines, extension cords, bridge crane bus bars).
- Entanglement hazards (situations that may cause the lift to be caught on or snagged against other objects).

- Contact with stationary objects (e.g., walls, buildings, other vehicles, ceilings, floors, piping) that may result in an entrapment or crushing hazard.
- Uneven terrain that may cause the vehicle to tip, topple over or eject the operator. Some examples may include slopes, holes, drop-offs, bumps, debris, and utility vault covers.
- High winds or inclement weather such as rain, hail, snow, or lightning.
- Operation of an internal combustion engine vehicle indoors, which can cause asphyxiation or toxic exhaust-gas exposure.
- Unapproved use of equipment in unusual environments or the use of inadequate controls for operations or maintenance activities, which can cause a fire or explosion.

3.0 Controls

3.1 General Discussion

The following sections provide requirements and best management practices for the various types of aerial lifts used at LLNL. When in doubt, default to the manufacturer's instructions for the particular make and model of the lift for more detailed guidance.

The information in this document shall be supplemented by good judgment, safety control, and caution in evaluating each situation. Since the operator is in direct control of the aerial lift, conformance with good safety practices is the responsibility of the operator. The operator shall make decisions on the use and operation of the aerial lift with due consideration for the fact that his or her own safety as well as the safety of others is dependent on those decisions.

All operators shall be trained before operating aerial lifts. Training requirements can be found in Section 4.0 of this document.

Operators are qualified to use lifts to the rated capacity of the equipment for which they are trained and evaluated. All operations shall be done safely and in accordance with accepted work practices. Directorates or facility points of contact may impose additional restrictions on their operations as necessary.

This document does not apply to subcontractors. For subcontractor ES&H requirements, see ES&H Document 2.5.

3.2 Maintenance

Frequent, annual and/or periodic (depending on activity, severity of service and environment) maintenance inspections shall be performed by the owner of the lift on a timely basis by qualified mechanics. Inspection items listed in the maintenance manuals shall be tested, evaluated and, if applicable, corrected by qualified personnel before the unit is returned to service. Lifts shall not be operated if they are out of compliance.

Replacement parts shall be identical or equivalent to the original parts, or provide a greater level of safety. Markings on the aerial lift shall not be removed, defaced or altered. Missing or illegible markings shall be replaced promptly. Altering or disabling of safety devices, such as warning beepers, guards or interlocks is prohibited, and modifications shall be done only with the permission of the manufacturer.

3.3 Operations

This section discusses various phases of operation such as prestart inspections, workplace inspections, operating requirements, and postoperation requirements.

An Integrated Work Sheet (IWS) is required for the use of aerial lifts. An IWS can be written specifically for the use of aerial lifts, or an IWS may list an aerial lift as one of the hazards for another operation. For example, Plant Engineering (PE) has trade/service IWSs that reference the general use of aerial lifts.

Operators shall be trained before using any aerial lift. The training shall include familiarization with the specific group of lifts to be used and alerting the operators to their responsibilities with respect to the lifts. When an operator is directed to operate an unfamiliar aerial lift, the operator shall receive instructions regarding the location of the manufacturers' manuals, the purpose and function of all controls, and the safety devices and operating characteristics specific to the group of aerial lifts prior to operating. Operators shall also be afforded the opportunity to familiarize themselves with the operation of the lifts.

The ES&H Team shall review and concur with all indoor work that involves lifts with internal combustion engines. Concurrence may be in the form of a specific IWS, Hazards Assessment Control Form (HAC), Pre-task Hazards Analysis (PHA), Safety Plan of Action (SPA), or other form of written communication, which will be attached to the paperwork completed for the specific job. For additional information on the indoor use of internal combustion engines, see Document 11.2, "Hazards—General and Miscellaneous," in the *ES&H Manual.*

3.3.1 Before Operation

Before operation, the operator shall:

- Perform a prestart inspection (see Section 3.3.3).

- Practice with the aerial lift (if unfamiliar with the lift) until comfortable/proficient with its operation.
- Read and understand the manufacturers' manuals.
- Understand all labels, warnings and instructions on the lift.
- Ensure that all occupants of the platform wear appropriate personal safety equipment for the conditions under which the platform will be operated, per the applicable Integration Work Sheet/Safety Plan (IWS/SP) (e.g., fall protection, hard hats).
- Have been instructed by a qualified person in the intended purpose and function of each of the controls.
- Notify and communicate with the Facility Point of Contact (FPOC) at the site where the lift will be used.

3.3.2 Workplace Inspections

Operators will inspect the workplace to mitigate hazards before and during aerial lift use. Areas will be inspected for hazards such as:

- Drop-offs, holes, or untamped earthfills.
- Slope(s), ditches, bumps, and floor obstructions.
- Debris.
- Overhead obstructions and high voltage hazards.
- Other hazardous locations and atmospheres.
- Inadequate support (The working surface that the lift is sitting on cannot support the weight of the machine, men, etc. for the operation).
- Wind and weather conditions.
- Presence of unauthorized persons or other hazardous conditions.

The ES&H Team member shall, with the operator's supervisor, determine if there are any unusual hazards in areas where lifts will be used.

3.3.3 Prestart Inspection

The aerial lift shall be inspected for defects prior to each shift's operation. The prestart inspection shall be performed and documented by the operator on each shift and will include items in accordance with manufacturer's recommendations for each specific aerial lift, such as:

- Operating and emergency controls.
- Safety devices.
- Personal protective devices.
- Hydraulic, air, pneumatic, fuel and electrical systems for wear, leakage, excessive dirt, moisture or any other condition which may impair the use of these systems.
- Fiberglass and other insulating components for visible damage or contamination.
- Missing or illegible placards, warnings, operational, instructional, and control markings.
- Visual inspection of all mechanical fastenings.
- Cables and wiring harnesses.
- Loose or missing parts.
- Wheels and tires.
- Operating manual(s), and their placement in weatherproof containers on the lift, or in the cab of the truck.
- Outriggers, stabilizers, and other structures.
- Guardrail systems.
- Other items specified by the manufacturer.

The aerial lift shall not be operated if the prestart inspection indicates that repair is necessary. See Appendices B, C, D, and E for sample inspection sheets.

3.3.4 Operation

The operator shall perform all prestart and workplace and operating inspections as specified in Sections 3.3.1, 3.3.2, and 3.3.3. When operating the lift, the operator shall follow the Operator Warnings and Instructions as specified in Appendix F.

The lower controls of aerial lifts shall not be used for continuous operation with personnel in the platform.

Aerial lifts are not normally insulated for use near electrically energized circuits such as power lines or exposed bus bars. In general, scissors lifts are not electrically insulated and will not provide protection from contact with or proximity to electrical current. Any aerial lift intended for use around electrically energized circuits shall meet the electrical requirements of American National Safety Institute/Scaffold Industry Association (ANSI/SIA) A92.2-2001, “Vehicle-Mounted Elevating and Rotating Aerial Devices.” Refer to the manufacturer’s owner’s manual and identification plate affixed to the machine for the category of insulating aerial device (if

applicable). Operators shall maintain safe distances from electrical power lines and apparatus in accordance with governmental regulations and the Minimum Safe Approach Distance (MSAD) chart provided in Appendix G.

Aerial lifts are not normally designed for use in hazardous locations, including, but not limited to the hazards listed in Section 3.3.2. Do not operate an aerial lift in hazardous locations or areas where potentially flammable or explosive gases or particles may be present. Refer to the manufacturer's owner's manual and identification plate affixed to the machine to determine whether it is permissible to operate the machine in hazardous locations (if applicable).

3.4 Documentation

Maintenance records shall be retained for five years (or longer if specified elsewhere) by the owner group, such as the Heavy Equipment Shop, and include written records of frequent, annual, and periodic inspections and repairs performed, including deficiencies found, corrective actions taken, and the person(s) performing the inspections/repairs.

Inspection sheets shall be kept for two years. If an inspection shows the need for maintenance or repair, the documentation shall be kept for at least five years.

4.0 Training

Only those workers who have received instructions regarding the inspection, application, and operation of an aerial lift, including recognition and avoidance of hazards, shall operate that aerial lift.

For scissor lifts, operators shall take Courses PE8019, "Scissor Manlift Operator Training," and PE8019-CERT, "Scissor Lift Certification."

For aerial man-lifts, operators shall take Courses PE8017, "Aerial Platform Operator Training," and PE8017-CERT, "Aerial Lift Certification."

For bucket trucks, operators shall take Courses PE8004, "High-Reach Bucket Truck Training," and PE8004-CERT, "High-Reach Bucket Truck Certification."

PE operators using UpRight UL 40 Man Lifts shall take the local training requirement Course PE8166, as well as the prerequisite Scissor Lift Training Courses PE8019 and PE8019-CERT. The Carpenter Shop shall also complete a checklist questionnaire with the operator to verify that the operator is trained to use the lift.

The operator shall be retrained if management notes any performance deficiencies, or every three years for aerial man-lifts or five years for scissor lifts or bucket trucks, whichever comes first.

Records of operators' training shall be kept in Laboratory Training Records and Information Network (LTRAIN).

5.0 Responsibilities

5.1 Operator

Before operation, the operator shall:

- Ensure that their training is current.
- Read and understand the manufacturers' manuals, per Section 3.3.1.
- Understand all labels, warnings and instructions on the lift, per Section 3.3.1.
- Ensure all occupants of the platform wear appropriate personal safety equipment for the conditions under which the platform will be operated (e.g., fall protection, hard hats), per Section 3.3.1.
- Have been instructed by a qualified person in the intended purpose and function of each of the controls, per Section 3.3.1.
- Notify and communicate with the FPOC at the site where the lift will be used, per Section 3.3.1.
- Ensure that manufacturers' machine manuals, such as operations manuals, the maintenance manuals for each make and model of lift owned, and the manual of responsibilities (if it is a scissor lift) are in the weatherproof containers located on the lifts or in the mobile unit, per Section 3.3.3.
- Be retrained, if necessary, based on the owner's or user's observation and evaluation of the operator or every three years for aerial man-lifts or five years for scissor lifts or bucket trucks, whichever comes first, per Section 4.0.
- Perform written prestart inspections before use of the lift each day or shift, and perform a visual and functional test, per Section 3.3.3. See Appendix B, C, D, or E for sample inspection sheets.
- Conduct workplace inspections before and during aerial lift use. See Section 3.3.2 for a list of inspection items.
- Observe operator warnings and instructions to be used before and during each movement of the platform. See Appendix F for a list of these warnings and instructions.
- Shut down lift operations in case of any suspected malfunction, or if a hazard or potentially unsafe condition exists. Notify the work supervisor about any problems or malfunctions that affect the safety of operations. These problems or malfunctions shall be repaired prior to the use of the lift.

- Perform prestart activities as described in Section 3.3.3 prior to performing work.

5.2 Owner/User

The Owner/User shall ensure that:

- Aerial lift safety programs are developed, documented and utilized as required.
- Manufacturers' manuals, such as the manual of responsibilities, operations, and maintenance manuals, are available and stored in the weatherproof containers on the lifts or in the mobile units, per Section 3.3.3.
- Frequent, annual and/or periodic maintenance inspections shall be performed on a timely basis (taking into account the severity of use and environment) by qualified mechanics trained for this purpose.
- Inspection items listed in the maintenance manuals shall be tested, evaluated and, if applicable, corrected by qualified personnel before the unit is returned to service.
- There is distribution of and compliance with all safety bulletins received from manufacturers.
- Assistance shall be rendered to operators who have questions concerning lifts.
- Modifications of the aerial lift equipment shall be made only by the manufacturer or with their prior written permission.
- If the location of the intended operation has the hazards listed in Section 3.3.2,the ES&H Team shall be consulted and safety measures discussed with, selected, and passed on to the operator before use of the lift.
- That operators comply with all requirements as specified in operator responsibilities in Section 5.1.

5.3 Work Supervisors

Work supervisors (e.g., Direct Work Supervisor, Job Site Supervisor) shall:

- Ensure that the aerial lift is used only for intended applications as defined in the operating manual, and that recognized safety practices are followed, per Sections 3.3 to 3.3.4.
- Select operators based on their experience and physical qualifications, per Sections 3.3 to 3.3.4.
- Ensure that operators' training is current, per Section 4.0.
- Monitor the performance of lift operators to ensure that they comply with safety rules.
- Ensure that unauthorized persons do not operate the lifts.

- Monitor daily written prestart inspections.
- Ensure that lifts are equipped with required safety equipment (e.g., overrides, back-up beepers, anchorage points for personal fall arrest systems), per Section 3.3.3.
- Ensure that lifts are maintained and that qualified personnel perform frequent, annual, and periodic inspections, per Section 3.2.
- Ensure that lifts are not operated if they are out of compliance with their applicable maintenance schedules, per Section 3.2.

5.4 Hazards Control Department

The Hazards Control Department ES&H Team shall:

- Determine, in conjunction with the supervisor, the safety measures to be taken if the lift will be used in a location that has unusual hazards, as discussed in Section 3.3.2.
- Review and approve indoor work that involves lifts with internal combustion engines. For additional information on indoor use of internal combustion engines, see Document 11.2.
- Make recommendations for alternatively powered lifts.
- Stay current with regulations governing the operation of lifts and transmit changes to the appropriate parties. (The Aerial Lift Subject Matter Expert has this responsibility.)

5.5 Facility Points of Contact

The Facility Points of Contact shall:

- Work with personnel using aerial lifts to establish/ensure work zones are posted and obeyed.
- Work with ES&H Teams to review and approve indoor work with aerial lifts.

6.0 Work Standards

6.1 Work Smart Standards

29 CFR 1910, Subpart F, “Powered Platforms, Manlifts, and Vehicle-Mounted Work Platforms,” (1910.66 to1910.68), January 1999; Standard 1910.67, Vehicle-mounted elevating and rotating work platforms (Bucket trucks and Aerial lifts).

29 CFR 1926, Subpart L, “Scaffolds,” 1926.450 to 1926.454, January 1999; Standard 1926.453 addresses aerial lifts.

6.2 Other Requirements

ANSI/SIA A92.2-2001, for Vehicle-Mounted Elevating and Rotating Aerial Devices (Bucket Trucks).

After repair, insulating systems on units shall be dielectrically tested in accordance with Section 5.4.3 of ANSI/SIA A92.2-2001. Insulated replacement boom shall be tested to ensure conformance to Section 5.3.3. of ANSI/SIA A92.2-2001. For bucket trucks used in electrical work, see Part 4, ANSI C2-1997, NEC, as cited in ANSI-SIA A92.2-2001. Other rules and regulations may apply; see departments performing the work for more information.

ANSI/SIA A92.3-1990, for Manually Propelled Elevating Aerial Platforms.

ANSI/SIA A92.5-1992, for Boom-Supported Elevating Work Platforms (Aerial Platform Manlifts).

ANSI/SIA A92.6-1999, for Self-Propelled Elevating Work Platforms (Scissor lifts), plus Manual of Responsibilities.

Appendix A

Definitions

Aerial lifts	Devices/equipment designed to lift workers and tools to an elevated worksite. Includes scissors lifts, aerial man-lifts, and bucket trucks.
Bare-handwork	A technique of performing live-line maintenance on energized conductors and equipment whereby one or more authorized persons work directly on an energized part after having been raised and bonded to the energized conductors or equipment.
Category A Aerial Device	An aerial lift (usually a bucket truck) that has dielectric properties in order to resist electrical hazards. The dielectric components shall be certified annually to assure dielectric value.
Lower controls	Controls situated at ground level that can control the lift platform.
MSAD	Minimum Safe Approach Distance (to 'live' electrical lines, equipment and components.). See Appendix G. This does not apply to line trucks. See the manufacturer's manuals for more information.
Operators	Qualified persons who directly control the movement of the aerial lift. These persons are authorized, trained, and engaged in the lift operation. This could include any employee or subcontractor using a lift owned, rented, or leased by LLNL.
Owners	Persons or entities who have possession of an aerial lift. LLNL directorates and/or departments, such as Fleet Management, that own, lease, or rent the equipment can be considered owners. Owners do maintenance inspections.
Owner/User	Situations in which the owner is also the user of the lift. See the definitions for owners and users.
Upper controls	Controls situated in the platform, man-lift or bucket part of the aerial lift that also controls the movement of the lift.
Users	Persons or entities who have care, control and custody of the aerial lift. This person or entity may also be the employer of the operator, an owner, or lessee. At LLNL, directorates or departments, such as Laboratory Services, Plant Engineering or UTEL could be considered users.

Appendix B

Platform Lift Equipment Inspection Checklist

To be completed by operator when checking out and checking in equipment.

- Inspect equipment periodically.
- Use only equipment which is in safe working condition.
- DO NOT operate equipment if any items inspected need repair.
- Notify equipment yard attendant of any needed repairs or, in his absence, the maintenance mechanics in B-519.

Equipment Number/Type of Vehicle	
Location of Use	
Operators Name (Please Print)	**Phone#**
Badge #	**Pager #**
Inspection Date/*Out*	**Inspection Date/*In***
Hour Meter/*Out*	**Hour Meter/*In***

Check (Add if necessary)	**OUT O.K.**	**Repair Needed**	**IN O.K.**
Oil Level			
Fuel Level			
Coolant Level (DO NOT CHECK IF HOT)			
Tire Pressure			
Hydraulic Level			
Leaks			
CHECK OPERATIONS:			
Horn			
Gauges			
Brakes			

Lights			
Steering			
Attachments			
Accessories			
Backup Alarm			
Warning Lights			
Warning Buzzer			

RECORD MALFUNCTIONS, DAMAGE, OR PROBLEMS:

Platform Lift Equipment Inspection

AREA	OUT O.K.	Repair Needed	IN O.K.
PLATFORM			
1. Controller			
2. Switches			
3. Placards and Decals			
4. Control Tags			
5. Handrails and Chains			
CHASSIS			
1. Batteries			
2. Battery Charger			
3. Hydraulic Pump/Motor			
4. Valves			
5. Hydraulic Hoses and Tubing			

6. Hydraulic Oil Tank			
7. Lift Cylinder			
8. Limit Switch			
9. Placards and Decals			
10. Wheel and Tires Assemblies			
11. Steer Cylinder			
12. Steer Components			
13. Scissor Arms			
14. Safety Prop			
15. Pivot Pins/Bolts			
16. Switches, Ground Control			
17. Control Tags			
18. Hose and Cable			
19. Tire Pressure/Condition (if applicable)			

RECORD MALFUNCTIONS, DAMAGES, OR PROBLEMS:

Appendix C

Aerial Lift Daily Safety Inspection Checklist

To be completed prior to each use

Make: _____ ID Number: _____

Week Ending: _____

Inspector Initial/Time							
ITEM	SUN.	MON.	TUES.	WED.	THURS.	FRI.	SAT.
1. Check Load Charts							
2. Capacity							
3. Appearance							
4. Hazard Warning Signal							
5. Brakes							
6. Safety Chains							
7. Tire Condition							
8. Electrical							
9. Baskets							
10. Steering							
11. Safety Override							
12. Control Operation							

Comments: _____

Superintendent _____ _____

Please Print Signature

Date/Time: _____

Appendix D

Aerial Lift Equipment Inspection Checklist

- To be completed by operator when checking out and checking in equipment.
- Inspect equipment periodically.
- Use only equipment which is in safe working condition.
- DO NOT operate equipment if any items inspected need repair.
- Notify equipment yard attendant of any needed repairs or in his absence, the maintenance mechanics in B-519.

Equipment Number/Type of Vehicle	
Location of Use	
Operators Name (Please Print)	**Phone #**
Badge #	**Pager #**
Inspection Date/*Out*	**Inspection Date/*In***
Hour Meter/*Out*	**Hour Meter/*In***

Check (Add if necessary)	**OUT O.K.**	**Repair Needed**	**IN O.K.**
Oil Level			
Fuel Level			
Coolant Level (DO NOT CHECK IF HOT)			
Tire Pressure/Condition			
Hydraulic Level			
Leaks			
CHECK OPERATIONS:			

Horn			
Gauges			
Brakes			
Lights			
Steering			
Attachments			
Accessories			
Backup Alarm			
Warning Lights			
Warning Buzzer			

RECORD MALFUNCTIONS, DAMAGE, OR PROBLEMS:

Appendix E

UpRight UL40 Man Lift Inspection Checklist

- ☐ Transportation of Lift: The lift's gross weight is 1,033 lbs; requires trailer capacity of 1,500 lbs. Lift to be in lowered stowed position and secured in trailer.
- ☐ Barricading work areas.
- ☐ Review procedures for raising lift from lowered stowed position to upright position.
- ☐ Installing outriggers and leveling procedures.
- ☐ Test all four outrigger sensors.
- ☐ Test emergency descent valve.
- ☐ Check hydraulic fluid level. Must show on dip-stick.
- ☐ Check battery compartment for leaks.
- ☐ Operator's manual on lift.
- ☐ Lift gate latches.
- ☐ Condition assessment of lift.
- ☐ Test controls including emergency descent valve.
- ☐ Hazard assessment of work area.
- ☐ Controls in place for identified hazards.
- ☐ Ground man for emergency descent available and knowledgeable of descent valve.
- ☐ Complete job task.
- ☐ Lower lift to stowed position.
- ☐ Transport lift back to storage.
- ☐ Return key and daily lift inspection sheet to lift custodian.
- ☐ Report any problems with lift

  List any problems_____

  _____

Signature of employee completing inspection _____

Time of inspection _____

Date of inspection _____

Appendix F

Operator Warnings and Instructions

The aerial lift is used only for intended applications as defined in the equipment's operating manual. The following recognized safety practices shall be used:

1. Operators shall not use the lift in an unauthorized manner.
2. All platform occupants shall use fall protection (e.g., full body harness, shock-absorbing lanyard) connected to the anchorage point(s) provided at the platform position.
3. A hard hat shall be worn at all times when operating aerial lifts.
4. Other personal protective equipment, (e.g., eye, foot, hand, clothing) shall be worn as required.
5. The slope and grade for which the platform is rated shall not be exceeded. Aerial lifts may be equipped with tilt or other motion/capacity warning alarms. These alarms shall be operational. The limit switch shall not be altered or disabled. Operators shall not depend upon the tilt alarm as a level indicator.
6. The deployment of stability-enhancing means, such as outriggers, outrigger pads, stabilizers or extendible axles, shall be utilized.
7. The guardrail system shall be used per manufacturer's specifications. Entry gates or chains shall be closed before operating the lift.
8. Operators shall not overload an aerial lift. Occupants and equipment shall not exceed the maximum platform capacity (or the maximum capacity of the platform extension when so equipped).
9. Safe distances, including overhead clearance, shall be maintained between the operator, the machine and other objects. Electrocution hazards shall be avoided. Operators shall maintain safe distances from electrical power lines, conductors or bus bars. They shall allow for boom or platform movement or electrical line sway or sag. Operators shall follow minimum safe approach distances (MSAD); see Appendix G.
10. Operators shall not drive the mobile chassis close to an obstruction. The operator shall place his/her machine, then use the raise, swing, and boom functions to get in close. Operators shall use the slowest speed for such movements to avoid "bounce" of the platform.
11. Only Category "A" aerial lifts shall be used for bare-hand electrical work. Check manufacturer's instructions for testing, locking, tagging, and grounding.
12. Workers on the ground associated with the aerial lift operation shall wear appropriate head protection.

13. Operators shall not sit, stand, or climb on the platform guardrails or edge of the bucket. They shall maintain a firm footing on the platform floor at all times.
14. The use of railings, planks, ladders, scaffolds or any other device in or on the work platform for achieving additional working height or reach are prohibited.
15. Areas around aerial-lift operations shall be barricaded to prevent injury to pedestrians and other workers. When other moving equipment is present, precautions, such as warnings, barriers, or flashing lights shall be used as appropriate.
16. Observations shall be conducted on an ongoing basis to detect any deficiencies in equipment or method of use. Operator shall cease operation of the lift if any suspected malfunction occurs. Problems or malfunctions shall be reported to the supervisor as soon as possible. Any problems or malfunctions shall be repaired before using the platform.
17. Potentially hazardous locations shall be reported to the supervisor as soon as possible.
18. Aerial lifts with internal combustion engines operating inside a building, or other unusual operating support conditions, are prohibited unless specifically evaluated and permitted by the supervisor and the ES&H safety team member.
19. Care shall be taken to avoid entanglement.
20. Work area shall be kept clear of workers, equipment, and other obstructions before lowering the platform.
21. The engine shall be shut down and equipment refueled in a well-ventilated area.
22. Battery charging shall be conducted in a well-ventilated area.
23. Operators shall not use batteries that weigh less than the original equipment. Operators shall always wear protective clothing and eyewear when working with batteries.
24. The platform shall not be steadied by positioning it against another object.
25. Operators shall not attempt to increase the stability of a lift by attaching it to an adjacent structure. Operators shall not tie or attach lifts to any adjacent structures.
26. Operators shall not modify or alter an aerial lift. Mounting attachments for holding tools or other materials onto the bucket, platform, toeboards, or guardrail system can increase the weight in the bucket or platform.
27. Operators shall not place or attach fixed or overhanging loads to any part of the machine.
28. Operators shall not place loads outside the platform perimeter.
29. The platform shall not be used as a crane or jack, unless the manufacturer has approved these operations.
30. Operators shall not use the machine to push or pull another object.

31. Operators shall never use the boom to push the aerial lift along the ground or attempt to free a machine by lifting the wheels off the ground with the boom.
32. Operator shall limit travel speed according to conditions.
33. Traveling 50 feet or more with an aerial lift shall be done with the platform in the lowered or stowed position. Extensible or articulating booms shall be retracted or folded.
34. Elevated driving requirements and repositioning of the aerial lift while elevated shall include maintaining a clear view of the support surface and route of travel, ensuring the safety of workers in the area and maintaining safe distances from hazards and overhead obstacles that could present crushing hazards. Operators shall not drive over 0.5 mph with the platform elevated.
35. Stunt driving is prohibited.
36. When the aerial platform is unattended, it shall be secured to protect against unauthorized use.
37. The altering of safety devices is prohibited.
38. Personnel shall leave the lift before attempting to free a snagged platform.
39. Entering or exiting the elevated platform shall be done per the manufacturer's instructions.
40. Operators shall use the three (3) point contact method (3 out of 4 arms and legs in contact with the machine) when mounting and dismounting the platform or bucket. Never attempt to mount or dismount a moving machine or climb down the frame or boom from the platform or bucket when raised.
41. When required to exit or climb out of an elevated aerial lift to a location not otherwise protected by guardrails, floors, or other continuous means of fall protection, operators shall use a second shock-absorbing lanyard to connect to the new location before disconnecting from the aerial lift. When entering an aerial lift from an unprotected location, operators shall connect a shock-absorbing lanyard to the anchorage point in the aerial lift before entering.
42. Modifications will only be approved with or by the prior written permission of the manufacturer.
43. Materials shall be carried on the platform as specified in the manufacturers' recommendations for load capacity.
44. The rated horizontal force on the platform shall not be exceeded.
45. Operators shall not exceed the manufacturers' limits when pushing on or pulling toward any object outside of the lift or platform.
46. Steps shall be taken to avoid collision of the platform with any crane or overhead equipment, moving or not.

47. Support requirements for the platform shall be adequate before work begins.
48. The aerial platform shall be leveled using the manufacturers' outriggers and leveling devices and the brakes set.
49. Operators shall not use lifts as a ground for welding.
50. Operators shall not increase the surface area of a platform or the load. By increasing the area exposed to the wind, the stability of the machine is decreased.
51. Only one designated person should operate the controls. Operators shall never allow anyone to tamper with, service, or operate a machine from the lower control station while workers are in the bucket or platform except in an emergency.
52. Operators shall not operate lifts during inclement weather, unless approved by the manufacturer for this purpose (i.e., bucket/line trucks).

Appendix G

MSAD (Minimum Safe Approach Distance) to Energized (Exposed or Insulated) Power Lines

Voltage Range (Phase to Phase)	Minimum Safe Approach Distance (Feet)	(Meters)
O to 300V	AVOID CONTACT	
Over 300 to 50KV	10	3.05
Over 50KV to 200KV	15	4.60
Over 200KV to 350KV	20	6.10
Over 350KV to 500KV	25	7.62
Over 500KV to 750KV	35	10.67
Over 750KV to 1000KV	45	13.72